

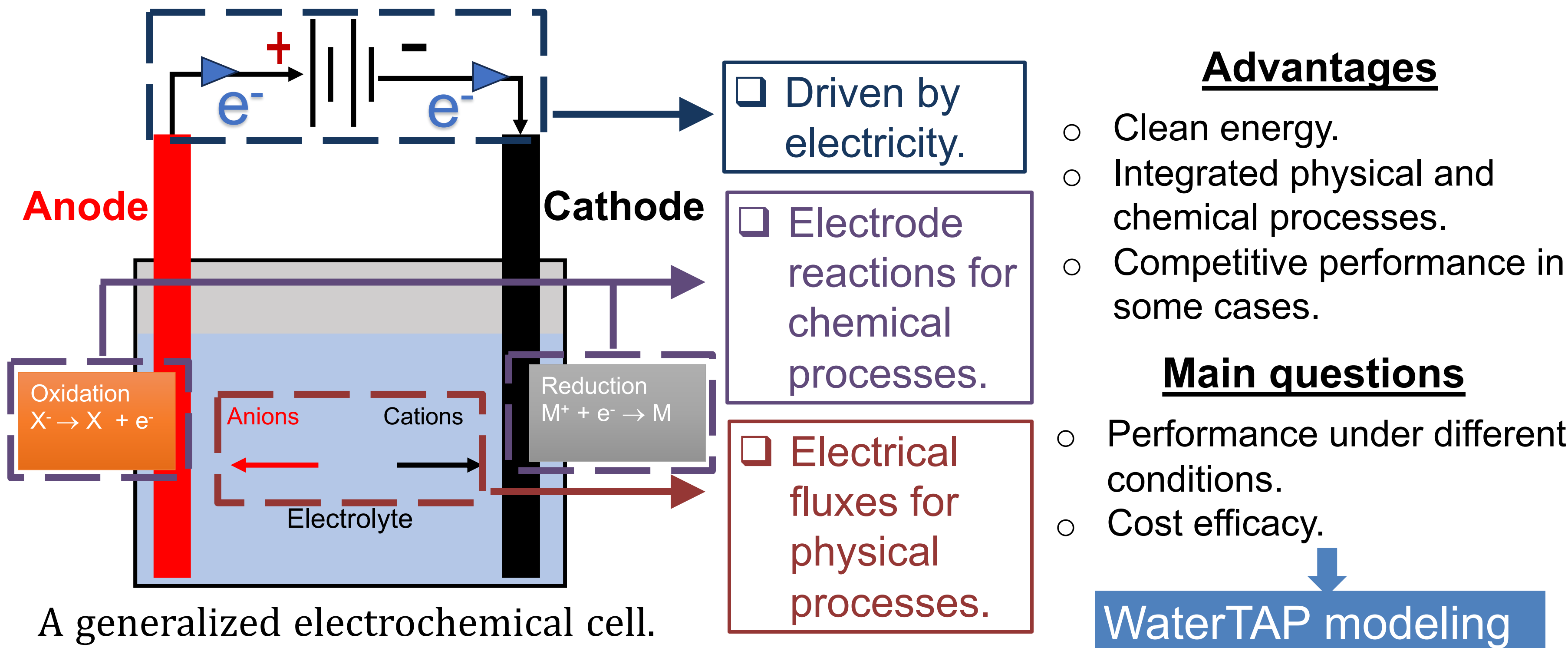


Electrochemical Processes in WaterTAP

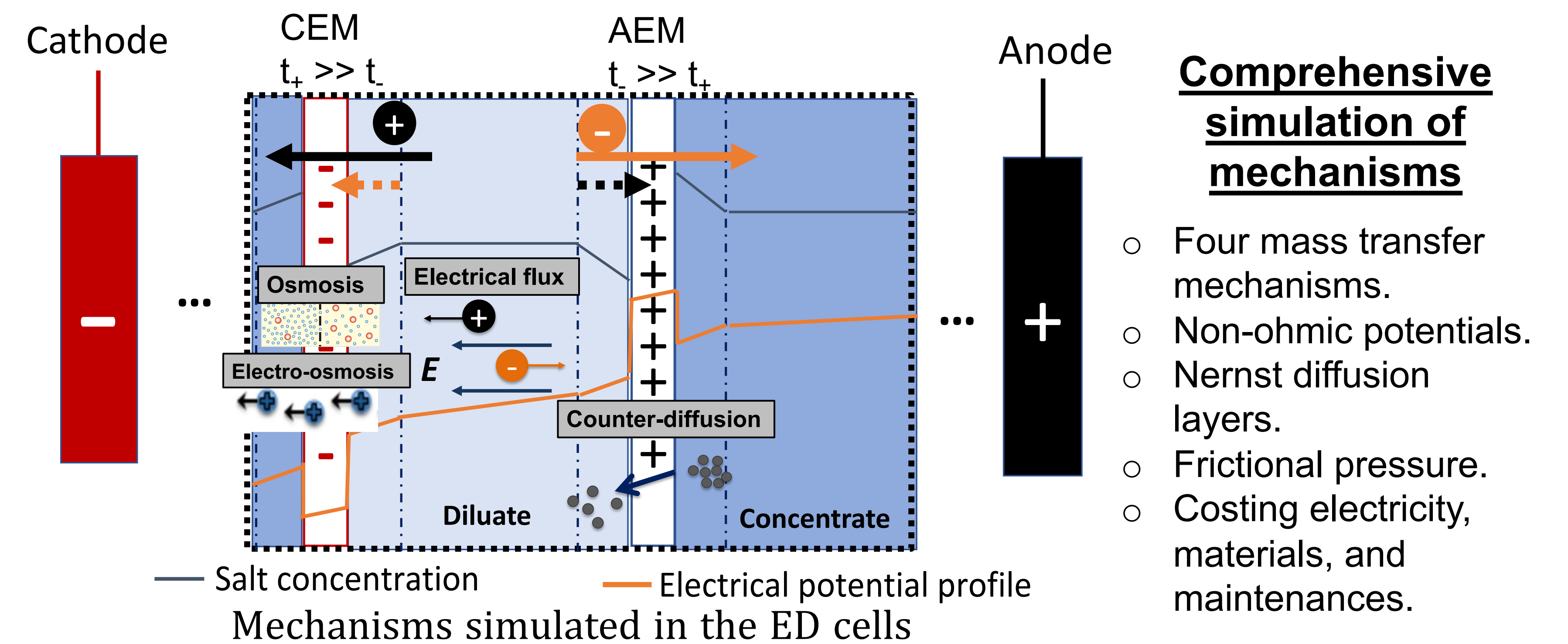
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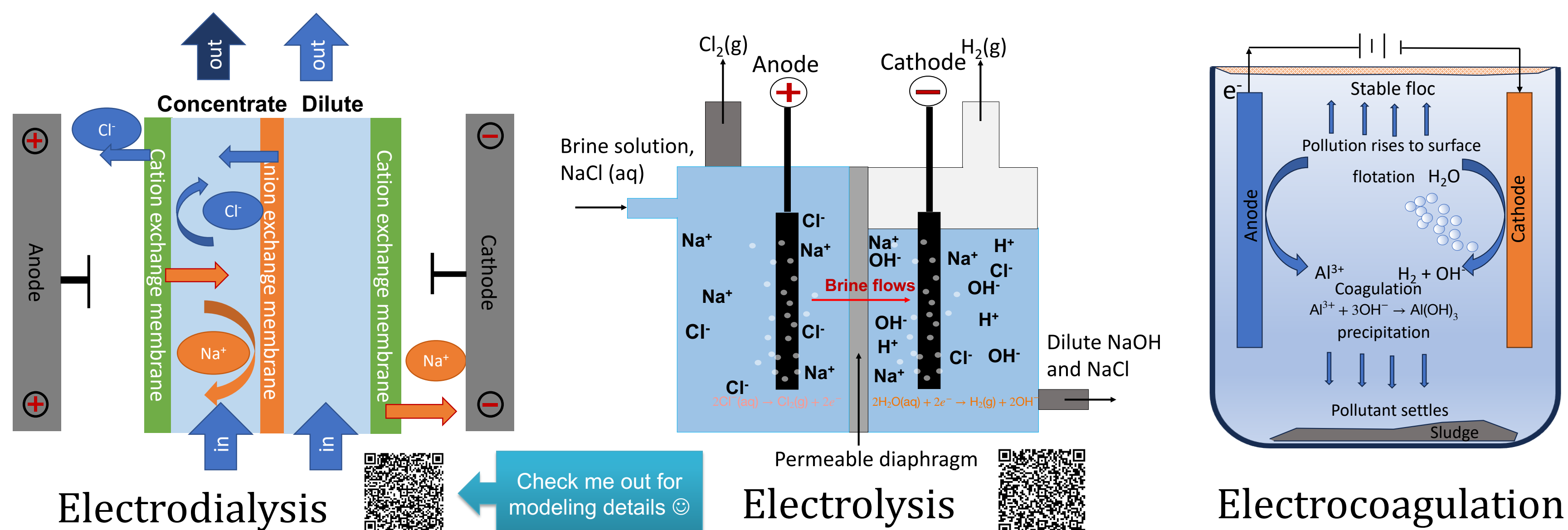
Electrochemical processes in water treatment



Case study: electrodialysis (ED) modeling and analysis



Major technologies and key modeling strategies in WaterTAP



Modeling core: 0-D or 1-D simulation of mass balances in reactors.

Generic mass transfer continuity:

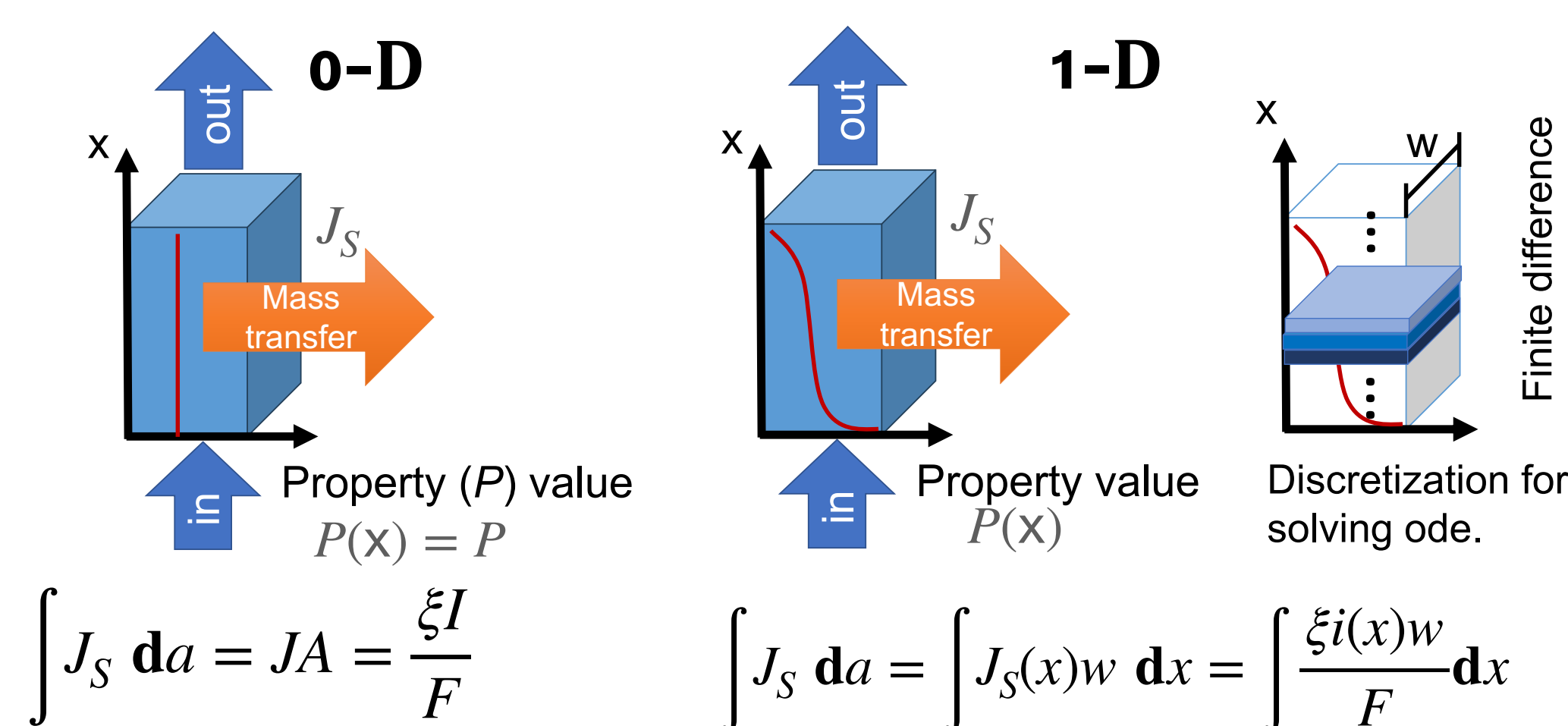
$$\frac{d}{dt} \left(\int C \, dv \right) = QC_i - QC_e + \int J_S \, da$$

Steady state modeling:

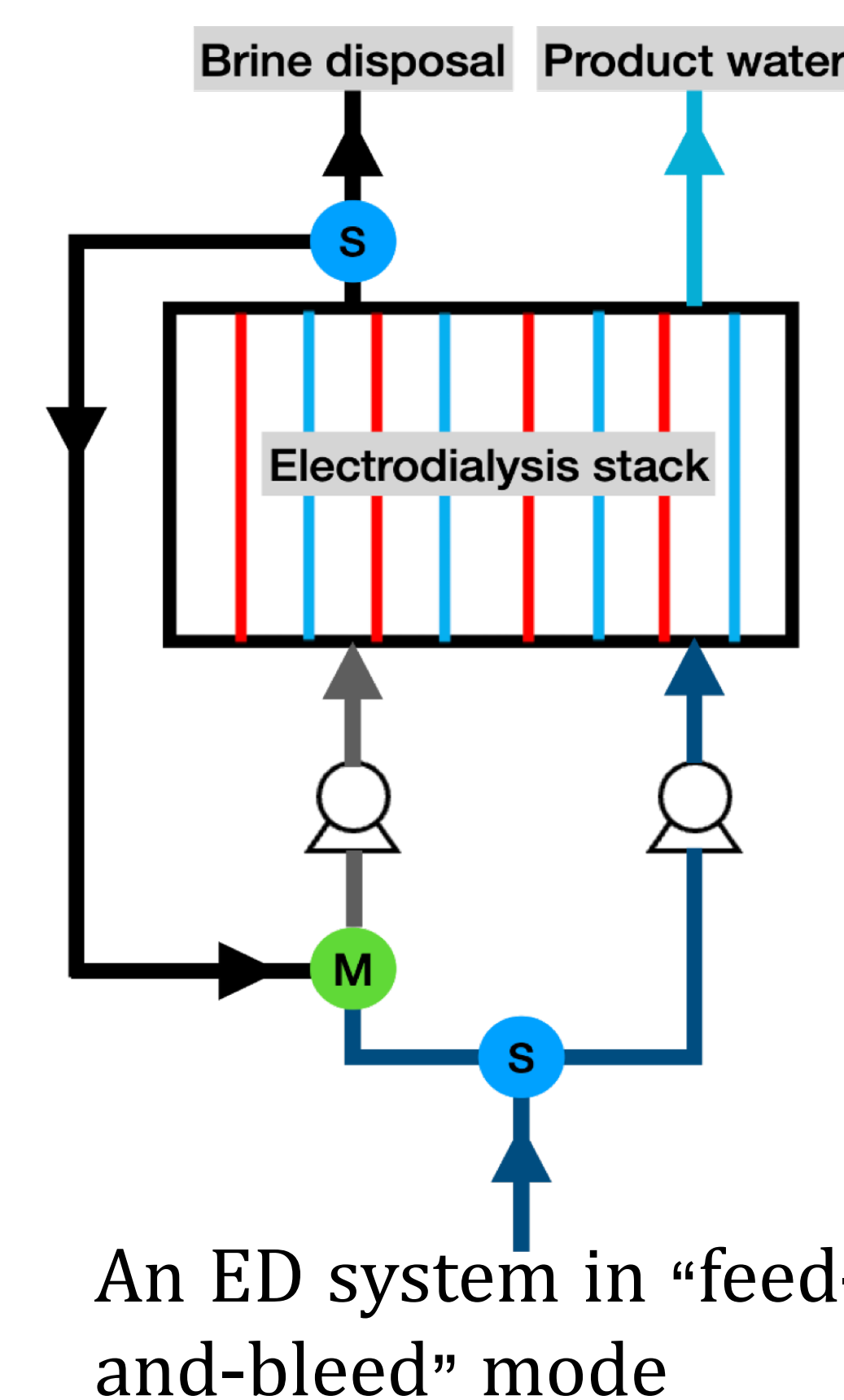
$$QC_i - QC_e + \int J_S \, da = 0$$

Ideal selectivity and solution, 1:1

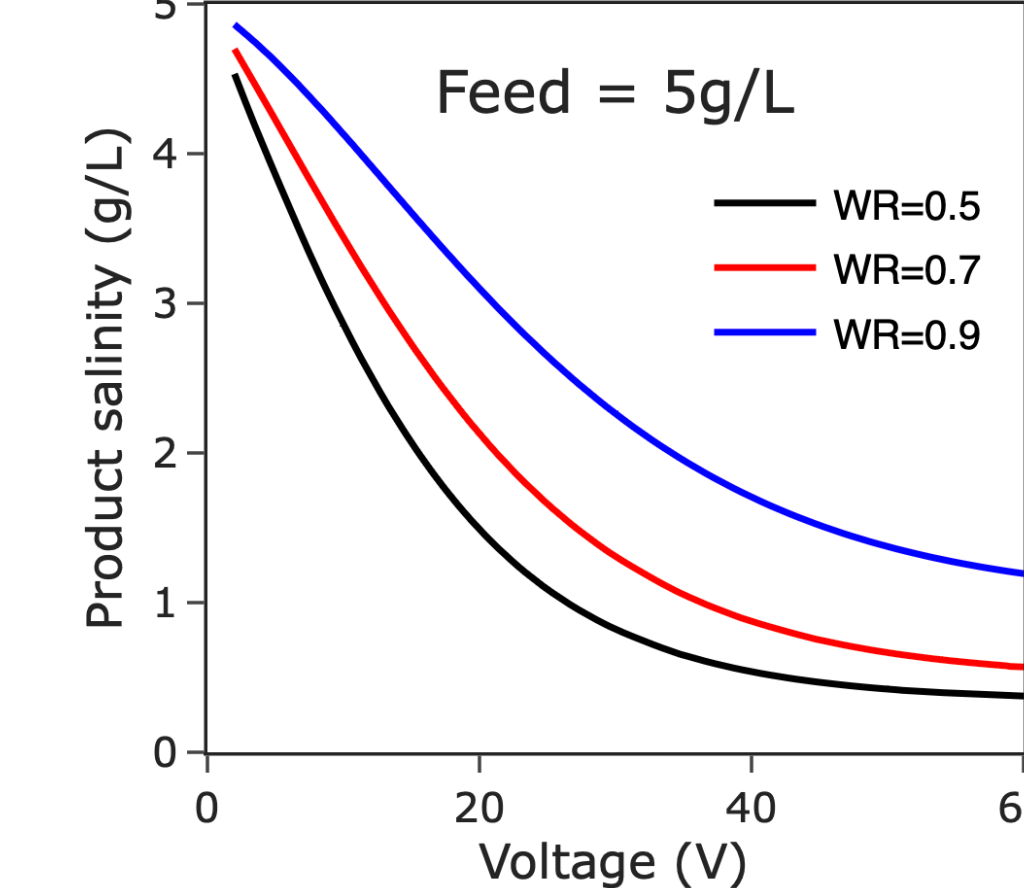
$$\text{electrolyte: } J_S = \frac{\xi i}{F}$$



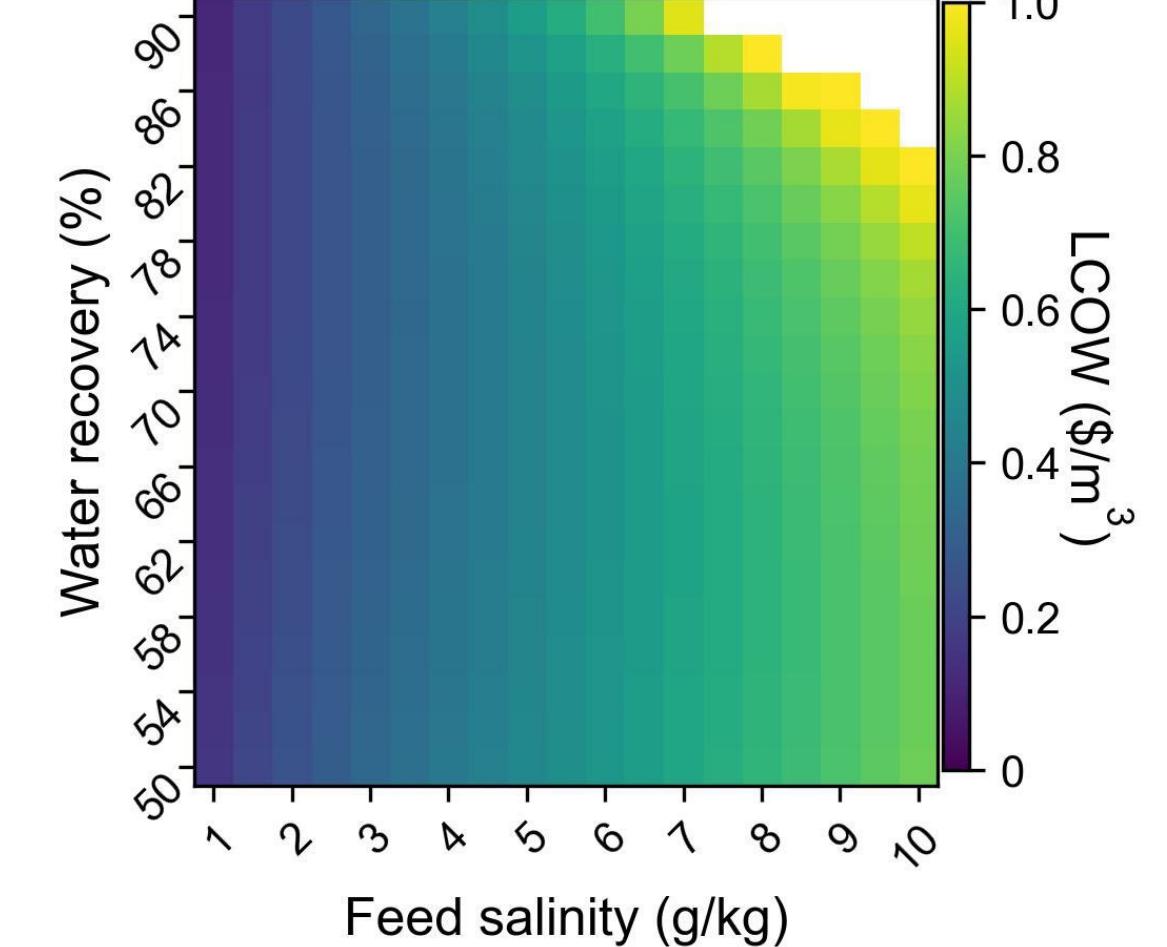
Simulation and optimization



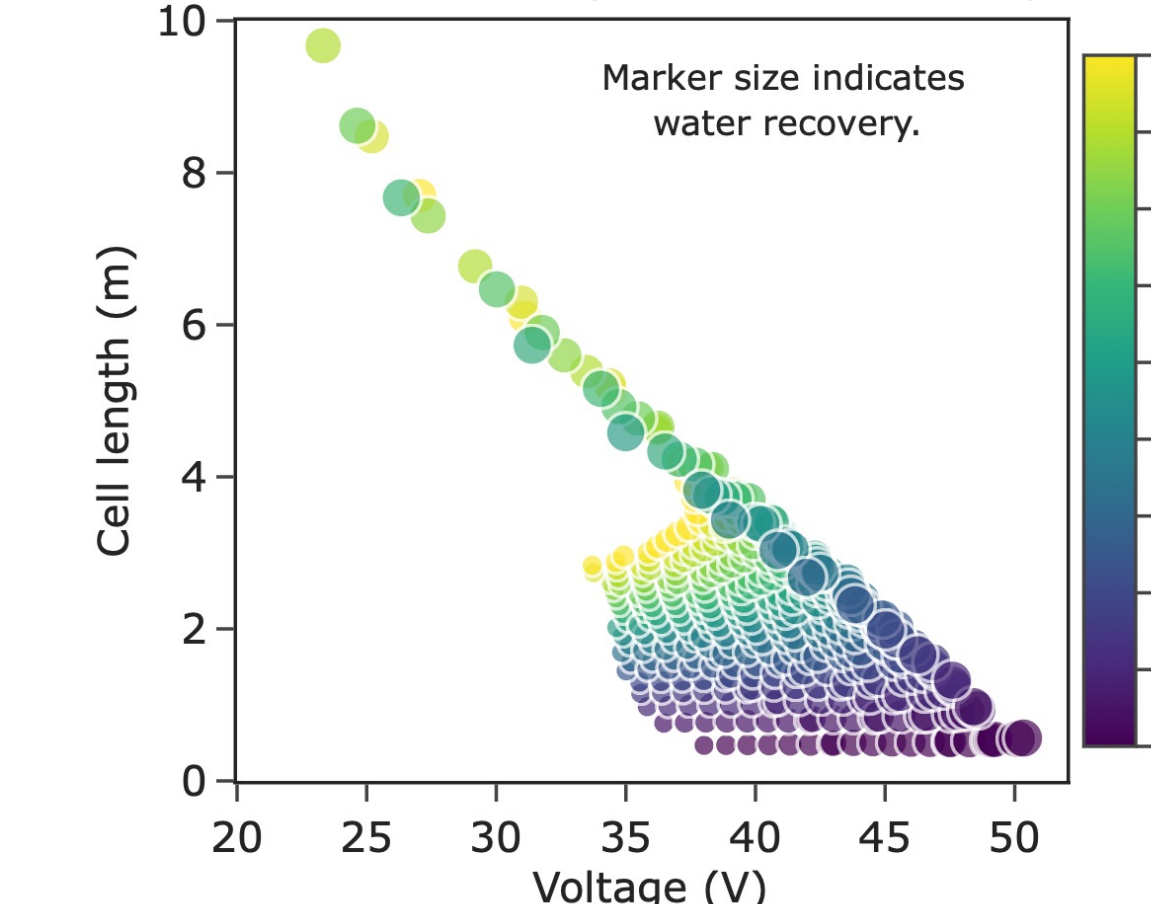
Performance prediction



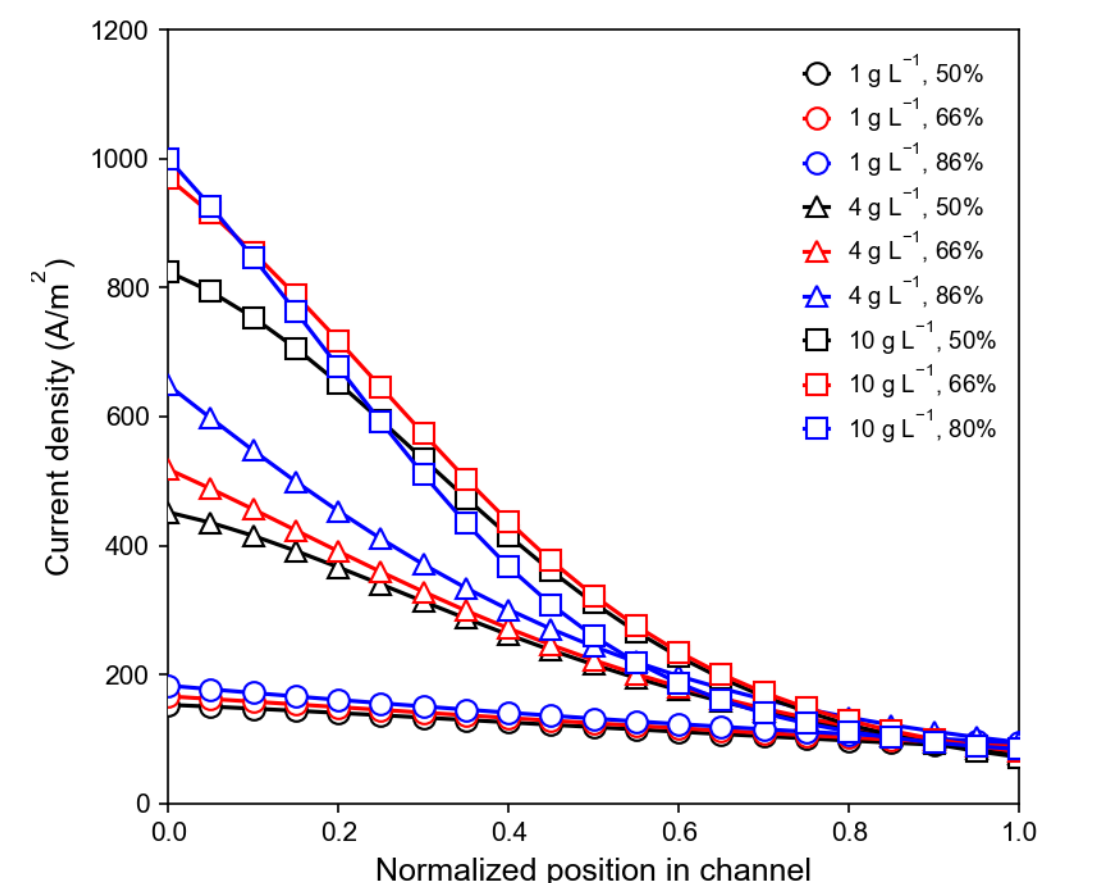
Minimized LCOW



Optimization-guided designs



Details over the flow path



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